COLLEGE OF SCIENCE

The University of Notre Dame awarded its first bachelor of science degree in 1865. Before that time, courses had been taught in mathematics (from 1842), in biology (from 1844), and in chemistry (from 1850). In 1867, a program in general science was formulated. Subsequently, specialized programs were added, leading to the degree of bachelor of science in botany and in zoology (both now covered by one degree in biological sciences), in environmental sciences, in biochemistry, in chemistry, in physics, in mathematics, and in preprofessional studies.

Departments of the College of Science

The Department of Applied and Computational Mathematics and Statistics is housed in Crowley Hall, in the academic center of campus. The facilities include office space for faculty members, graduate students and postdoctoral associates, as well as space for these department members to collaborate with undergraduate students in research and educational activities. The department has access to the computing resources of the Center for Research Computing and computing facilities dedicated to department research groups.

The Department of Biological Sciences, located in the Galvin Life Science Center, has well-equipped laboratories for undergraduate and graduate research, spanning the wide realm of the life sciences, across scales of complexity—from cells and organs to whole organisms and ecosystems. The facilities include controlled-environment rooms; an optics facility containing confocal microscopes, scanning and transmission electron microscopes; molecular analysis facilities for DNA sequencing, microarrays, cell sorting; and extensive data storage and retrieval equipment.

The Hank Center for Environmental Science provides more than 20,000 square feet of state-of-the-art research space for aquatic, terrestrial, and environmental studies that includes greenhouses, wet laboratories, and a field sample processing room.

The Freimann Life Science Center provides additional laboratories, vertebrate animal care, and associated specialized modern research facilities to serve the expanding needs of life science research at Notre Dame.

The Jordan Hall of Science contains 16 state-of-the-art biology laboratories for teaching undergraduate and graduate life science laboratory courses. In addition, the collections of museum specimens, including the Greene-Nieuwland Herbarium and the Museum of Biodiversity, are available for research and teaching, housed in superb facilities in Jordan Hall.

The Department of Chemistry and Biochemistry, located in Nieuwland Science Hall, McCourtney Hall, and Stepan Hall of Chemistry and Biochemistry, has laboratories devoted to research in several areas of chemistry: physical, inorganic, organic, and biochemistry. The laboratories are equipped with all necessary facilities for undergraduate students, graduate students, postdoctoral investigators, and faculty. Undergraduate researchers have access to seven high-field NMR spectrometers and three state-of-the-art single crystal X-ray diffractometers, plus many other pieces of equipment such as infrared, ultraviolet, Raman, mass spectrometer; photoelectron spectroscopy; potentiostats; analytical and preparative HPLC and GC equipment; special apparatus for studying mechanisms and rates of reactions; and cell culture facilities. For theoretical work, two large parallel cluster supercomputers are available. The facilities of the Radiation Research Laboratory are used by some faculty of the chemistry department for research in physical chemistry.

The new Jordan Hall of Science houses all of the undergraduate teaching laboratories for chemistry and biochemistry. Included are spacious facilities for introductory and organic chemistry; analytical, physical, and inorganic chemistry; and biochemistry. The building also contains a new NMR spectrometer. Also within Jordan Hall are two large lecture rooms specially designed for teaching introductory science courses, along with a 150-seat multimedia visualization center.

The Department of Mathematics is housed in Hayes-Healy Center/ Hurley Hall, conveniently located in central campus. The facilities for undergraduate and graduate instruction and research in mathematics include a first-rate research library; a faculty room; offices for the faculty, postdoctoral investigators, and other visitors, graduate students, and staff; several research seminar and conference rooms; and several large classrooms with state-of-the-art media capability.

The Department of Physics and Astronomy, located in Nieuwland Science Hall, has teaching facilities and laboratories for both undergraduate and graduate research. There are facilities for experimental work in astrophysics, biophysics, condensed-matter physics, elementary particle physics, and nuclear physics. There are three atomic spectroscopy laboratories, and some additional use is made of facilities at Argonne National Laboratory. Elementary particle experiments are done at the Stanford and Fermi national laboratories, and at CERN in Geneva, Switzerland. Detector development for the major accelerators is also being done in the department. The Nuclear Science Laboratory has two accelerators dedicated to nuclear astrophysics. This facility is home to the second largest low-energy nuclear physics program in the country. A variety of solid state facilities are available for the study of metals, high Tc superconductors, and semiconductors. Off-site facilities at Argonne, the National High Magnetic Field Laboratory, and the National Institutes of Standards and Technology are also heavily used. Notre Dame is a partner in the Large Binocular Telescope project. This will be one of the most capable facilities in the world for cutting-edge cosmology and astrophysics research. Research is conducted in many major areas of theoretical physics, including all of the above areas as well as statistical mechanics, field theory, general relativity, and astrophysics. The department has a substantial machine shop and research library and a variety of staff technicians. Many faculty members and research groups have computing facilities, and all have access to the Office of Information Technologies' very large computers.

Jordan Hall of Science houses all of the undergraduate teaching laboratories for physics, including spacious facilities for introductory mechanics, electricity and magnetism, and modern physics. Within Jordan Hall are also a laser and optics lab and an advanced laboratory for physics majors. The building also hosts a rooftop observatory equipped with a dozen small telescopes for introductory astronomy courses, along with a separate dome housing a large, researchquality telescope for physics and astronomy students. Jordan Hall is also home to a 150-seat digital visualization theatre that serves as a planetarium for a variety of astronomy and astrophysics courses.

The Department of Preprofessional Studies is located in the Center for Health Sciences Advising in the Jordan Hall of Science. This center centralizes the advising process for all University students interested in the health professions. All courses for students enrolled in the preprofessional program and collegiate sequence programs are provided

by the other departments of the College of Science and the other colleges of the University.

Undergraduate Education

The aim of the program of undergraduate education in the College of Science is to produce intellectually able graduates who are grounded in the broad fundamental principles of the basic sciences, versed in the advanced concepts of their chosen scientific discipline and educated in the humanities and social sciences. Each graduate should be a good scientist in his or her own field; a fully developed person, aware of his or her responsibilities to society and prepared to participate fruitfully in the affairs of society.

Education in science at Notre Dame is a coordinated program involving the basic sciences, the chosen advanced science, and the humanities and social sciences, including theology and philosophy. In this education, the student should acquire a thorough, integrated, and broad understanding of the fundamental knowledge in his or her field, a competence in orderly analytical thinking, and the capacity to communicate ideas to others, orally and in writing. T his system of education is so arranged to develop in each student the desire and habit of continuing to learn after graduation, advancing over the years to higher levels of professional and personal stature and keeping abreast of the changing knowledge and problems of his or her profession.

Emphasis is placed on fundamental principles so that the students can develop abilities to apply these principles to the solution of new problems never before encountered by society, to the discovery of new things and to the invention of devices not learned about in books. Notre Dame stresses basic concepts useful in later learning rather than masses of particular facts and data that can better be found in books at the time of need.

Curricula and Degrees

The College of Science offers curricula leading to the degree of bachelor of science in each of six undergraduate departments:

Applied and Computational Mathematics and Statistics
Biological Sciences
Chemistry and Biochemistry
Mathematics
Physics
Preprofessional Studies

The following are degree programs offered by these departments:

Applied and Computational Mathematics and Statistics
Biochemistry
Biochemistry with a concentration in Neuroscience
Biological Sciences
Chemistry
Chemistry combined with Computing
Chemistry with a concentration in Neuroscience
Environmental Sciences
Mathematics
Mathematics (concentration with other programs)
Neuroscience and Behavior
Physics
Physics-in-medicine
Preprofessional Studies
Science-Computing
Science-Education
Statistics

These degree programs are described in detail in later sections of this *Bulletin*.

See also the bachelor of science degree programs offered by the College of Engineering:

Computer Science
Environmental Geosciences

Each College of Science student must enroll in the department of his or her major beginning with the sophomore year; however, a student may change primary majors in the College of Science at any point up until the last drop day of the 7th semester in consultation with their advisor and dean. Concentrations, second and supplementary majors, and minors may be changed at any time; provided, however, that a student's request to change his/her curriculum generally will be denied if the requested change would require the student to remain at the University beyond 8 semesters, or if the proposed plan of study would require a student to carry an overload.

The College of Science maintains a website at science.nd.edu (https://science.nd.edu/). Further information related to programs offered by the college may be found at that location.

Listed below are the allowed options for students interested in double science majors, double majors between colleges, second majors in the College of Science, and supplementary majors and minors in the College of Arts and Letters.

Students pursuing one of these combination programs must have superior scholastic ability and be formally accepted by the dean of both colleges involved. Approval will not be granted if there is substantial overlap between the two programs.

Note: Courses may only be counted once at each of the following tiers:

1. University and core requirements
2. College and primary major requirements
3. Any other program (second major in another college, supplemental major in another college, or minor), except for courses required by a defined program within the college of science. Additionally, each minor must have 50% or more unique courses.

Double Science Majors

In certain instances, students have the option of pursuing majors in two departments in the College of Science. Combinations that are normally approved include: Biological Sciences with Chemistry; Biological Sciences with Mathematics; Biological Sciences with Physics; Biochemistry with Mathematics; Biochemistry with Physics; Chemistry with Mathematics; Chemistry with Physics; Environmental Sciences (first major) with Mathematics; Mathematics with Physics; and Science Computing, Science Education with supplementary major in ACMS or Statistics. Examples of combinations that are normally forbidden include: Preprofessional Studies with any other science majors, Collegiate Sequence majors (Science Computing, Science Education) with any other science majors except supplementary majors in ACMS and Statistics, parallel subprograms such as Mathematics and Life Sciences with Physics-in Medicine and either of those with Biological Sciences or Biochemistry, any majors among Mathematics, ACMS and Statistics. All requirements of each major must be met, with no exceptions. Failing to complete a required course terminates that major for a student. Every student who wishes to major in two departments in the College of

Science must prepare an agenda of specific courses to be taken, which both advisors and the dean must approve. This should be done as early as possible, but absolutely no later than the seventh day of the senior year. In certain instances, a student may possibly receive approval of a normally forbidden combination of majors, but only if a specific program has been set up by the seventh day of the sophomore year.

All double major programs in science are extremely challenging programs that require that the student take four or five science courses at a time. Thus, only students of superior scholastic ability should consider this as an option.

Students are warned that it is almost certain that completing a double major in two sciences will require total credits well over the college minimum of 124. Conflicts in scheduling of required courses may occur; neither the college nor the departments undertake to reschedule courses for the sake of double majors. For these reasons, it must be emphasized that completing a double major may well require more than four years. Only one degree is awarded (degrees in science do not specify a field).

Dual Degree

Notre Dame students pursuing majors in two of the undergraduate colleges may qualify for a five-year dual-degree program.

The requirements for a dual degree generally are as follows: The student completes all of the university requirements, all of the requirements for both colleges, all of the requirements for both majors, and the total number of degree credits specified for a dual degree in the two colleges. While the total number of hours required does depend on the two major programs, the minimum required total number of degree credits is set to be 30 degree credits beyond the college total for the college with the greatest required number of degree credits.

Double Majors in Two Colleges

Qualified Notre Dame students pursuing majors in one of the other undergraduate colleges or schools may add another major in the College of Science. Additionally, qualified Notre Dame students pursuing a major in the College of Science may also add another major in one of the other undergraduate colleges or schools.

The requirements for a double major between colleges generally are as follows: The student completes all the University requirements, the requirements of his or her college or school, and the requirements of both majors. In general, a single course may not satisfy requirements for both majors.

Supplementary Majors and Minors

Qualified Notre Dame students pursuing majors in the College of Science may add a supplementary major or minor. Options include programs offered through the College of Arts and Letters and the Environmental Geosciences minor offered through the College of Engineering. Science students may not add the Arts and Letters Preprofessional Studies supplementary major.

Supplementary Majors, Minors, and Concentrations in the College of Science

In the College of Science, the term "second major" is used for a supplementary major. Three departments offer a second major program specifically for students in the other colleges: mathematics as a second major, physics as a second major, and environmental sciences as a second major. The Applied and Computational Mathematics and Statistics department offers supplementary majors for students with a primary major in other departments in the College of Science, as well as other colleges. Likewise, Environmental Science is available as a supplementary major for science students who are not majoring in Biological Sciences, Preprofessional, or one of the Science collegiate sequences (SCCO and SCED). For details, see the departmental sections of this *Bulletin*.

Four departments in the College of Science offer concentration programs: Applied and Computational Mathematics and Statistics, Chemistry and Biochemistry, Mathematics and Physics. For details, see the departmental sections of this *Bulletin*.

Combination Five-Year Program with the Mendoza College of Business

The College of Science and the Mendoza College of Business have established a competitive cooperative program in which a student may simultaneously earn a bachelor of science and a master of business administration degree. The program is structured so that the student who has completed the three years of a science bachelor's degree program, if accepted, completes the master of business administration and the bachelor of science in a major in the College of Science in a summer session and two subsequent academic years.

Students who wish to pursue this program should have a superior scholastic record in their major program and must make application to, and be accepted by, the MBA program.

The general sequence of courses in the five-year Science-MBA program may be found under "Dual Degree Program with the Mendoza College of Business," later in this section of the *Bulletin*.

University and College Requirements

A minimum of 124 credit hours is required for graduation from the College of Science. A minimum of 60 credit hours must be in science; however, each department may specify more than 60 credit hours for any of its programs. A minimum cumulative and major GPA of 2.0 is required for graduation.

All College of Science majors must fulfill University requirements. The specifics of University Requirements are listed in this *Bulletin* on pages 15–18.

Six courses in the liberal arts:

1. Quantitative Reasoning[1]
2. Science and Technology[1]
3. An additional course in Quantitative Reasoning or Science and Technology[1]
4. Arts and Literature or Advanced Languages and Cultures[1]
5. History or Social Science[1]
6. Integration, or a course from an area not yet chosen in 4 or 5.[1]

[1] One of these requirements must be designated as a University Seminar course typically numbered as 13180–13189.

Four courses exploring explicitly Catholic dimensions of the liberal arts:

1. A foundational Theology course[1]
2. A developmental Theology course[1]
3. A Philosophy course[1]

4. An additional Philosophy course or a Catholicism and the Disciplines course.[1]

[1] One of these requirements must be designated as a University Seminar course typically numbered as 13180–13189.

Two courses in writing:

1. A University Seminar
2. A Writing and Rhetoric course, or another writing-intensive course.

The two-semester Moreau Program.

In addition, all College of Science majors must take courses in:

- Chemistry (CHEM 10171 and (CHEM 10172 or CHEM 10122) or CHEM 10181, CHEM 10182)
- Mathematics (MATH 10350, MATH 10360 or MATH 10550, MATH 10560 or MATH 10850, MATH 10860)
- Physics (PHYS 10310, PHYS 10320 or PHYS 10411, or PHYS 20210, PHYS 20220).

The appropriate sequence for a student depends on the student's major.

The College of Science requires language proficiency through intermediate level. "Intermediate proficiency" is defined differently in each of the languages, depending on the complexity of the language and the intensity of the course. Students may complete the language requirement by either completing a course taught at intermediate level or by demonstrating proficiency through placement examination. The college office maintains a list of language courses at intermediate level. (See the college website, science.nd.edu (https://science.nd.edu/) under Academic Information Frequently Asked Questions.)

Students with no previous background in a language should start with a beginning-level course. They take typically either nine credits over a three-semester period, eleven credits over a three semester sequence, or two semesters of an intensive language sequence (10 credits total). Students with Advanced Placement or SAT II credit may receive up to eight credit hours of language toward their degree. If for some reason more than eight credits appear on the transcript, only eight credits will count toward the required 124 credits. Students who arrive with some background in the language they elect, but without AP or SAT II credit, will be placed by departmental examination but will receive no credit hours.

The College of Science will count a maximum of one credit hour from the following types of activity courses:

Band (Marching and Concert)
Orchestra
Chorale
Glee Club
Liturgical Choir
Folk Choir
Music Lessons and Ensembles
Dance
Debate
Science in the Classroom

Additionally, a maximum of twelve credit hours of upper-level (30000- or 40000-level) ROTC courses can be counted toward the 124-credit-hour requirement. These courses will be counted as free electives.

The College of Science works with the Institute for Social Concerns (see page 27 of the *Bulletin*) to develop relevant, community-based opportunities. Science majors may count as general electives up to 3 credits for approved Summer Service Learning Program courses (e.g., THEO 33936 Summer Service Learning: Kinship on the Margins) or Social Concerns Seminars (e.g., CSC 33951 U.S. Healthcare - Washington DC Seminar).

Not all science courses will count toward degree credit or science elective credit for science majors. The survey science courses offered as options for non-science majors for their University science requirement will not count as a science elective or toward the minimum science credit hour requirement. Because of overlap in content with required courses for science majors, many of these courses will also not count toward the degree credit requirement (see "Science Degree Credit," later in this section of the *Bulletin*).

Some major programs have a science elective requirement. For a course to be a science elective, it must meet the following rules: (1) It is offered through one of the departments of the College of Science or through the college itself. (2) It is major's level; that is, other science majors are required to take this course to meet a major requirement or it has a prerequisite course that is offered for science majors, or the *Bulletin* description for the course states that it is a science elective in the College of Science. Finally, the departments may place additional restrictions on allowed science electives, e.g., for biological sciences major one science elective must be a non-biology course.

All College of Science courses offered by a major program must be taken at the University of Notre Dame. If a student wants to take a course outside Notre Dame for credit toward the Notre Dame degree, prior approval of the dean's office must be obtained. This does not apply to the courses taken by a transfer student prior to attending Notre Dame.

Advising

Notre Dame science majors have been assigned an academic advisor upon matriculation. In some departments, the director of undergraduate studies for the department provides additional major advising. A complete list of names of advisors is kept on the science website.

Notre Dame students who have questions concerning the choice of a major or considering a change of major are urged to make appointments with their academic advisor and the directors of undergraduate studies in the departments involved. Students needing help choosing from similar majors may request an advising appointment with the associate deans of advising or undergraduate studies of the College of Science, 215 Jordan Hall. Any Notre Dame student who is considering a health profession can recieve advising in the Center for Health Sciences Advising in 219 Jordan Hall.

Student Organizations and Activities

In addition to participation in University-wide student activities, the undergraduate students of the College of Science may participate in activities directly related to science, including the undergraduate departmental science organizations: the Biology Club, the Notre Dame Chapter of Student Affiliates of the American Chemical Society, the Mathematics Club, the Society of Physics Students, the Premed Club (preprofessional), the Prevet Club, the Science-Business Club, and the Notre Dame Chapter of Alpha Epsilon Delta (premedical honorary fraternity).

Student Awards and Prizes

The Dean's Award. Presented to a graduating senior in the College of Science in recognition of exemplary academic achievements, leadership, and service to society.

The Dean's Research Award. Presented to a graduating senior in the College of Science in recognition of exceptional research that advances scientific knowledge in their field through publications and presentations.

Outstanding Senior Biological Scientist(s). To the senior(s) who has/have demonstrated the most promise in the biological sciences as evidenced by both academic performance and research participation.

Outstanding Biology Student Leader Award. Seniors nominated for this award must be exemplary student leaders in the Department of Biological Sciences. The student will have made outstanding contributions, through their leadership and service, to advance the interests of other students in the department.

Paul F. Ware, M.D., Excellence in Undergraduate Research Award. The top student nominated for the Outstanding Biological Scientist award will be chosen for the Paul F. Ware award, the highest honor given to a graduating senior in the department. Leadership and/or service in the department, college, or university are also key qualifications for this award.

Outstanding Environmental Scientist Award. Seniors nominated for this award must be exemplary students in the Environmental Science major with at least 3 semesters (or 2 semesters and 1 summer) spent in a Notre Dame faculty laboratory that emphasizes any aspect of environmental science. The student must have made a significant intellectual contribution to their lab, typically evidenced by a co-authored publication and/or national or regional conference presentation.

Mr. and Mrs. Frank McDonald Undergraduate Research Award. Seniors nominated for this award must be exemplary undergraduate researchers with at least 3 semesters (or 2 semesters and 1 summer) spent in a Notre Dame faculty laboratory. The student must have made a significant intellectual contribution to their lab, typically evidenced by a co-authored publication and/or national or regional conference presentation.

Mr. and Mrs. Frank McDonald Senior Leader Fellowship. The senior nominated for this award must have devoted substantial time and energy to create sustainable programs or other changes that fundamentally improve the student experience in the Department of Biological Sciences. This academic year fellowship is given periodically to a deserving undergraduate biology major.

Robert Braco, M.D., Honors Research Award. Seniors nominated for this award must be outstanding students in the Biology Honors program with at least 3 semesters (or 2 semesters and 1 summer) of undergraduate research in a Notre Dame faculty laboratory. The student must have made a significant intellectual contribution to their lab, resulting in a co-authored publication and/or a national or regional conference presentation. A successful candidate would also have been exemplary in all honors activities including the honors seminars, the graduate course, and the honors thesis.

Royal Society of Chemistry Certificate of Excellence. For outstanding achievements in chemistry or biochemistry.

Norbert L. Wiech Ph.D. Award. Given to a chemistry or biochemistry major in the junior year for outstanding achievement in academics and research.

Outstanding Biochemist Award. For leadership, academic achievements, research and scholarship in biochemistry.

Outstanding Chemist Award. For academic and research achievements in chemistry as an undergraduate.

William R. Wischerath Outstanding Chemistry Major Award. For academic achievements of a graduating senior chemistry major.

Chemistry-Education Award. For academic achievements in preparation for teaching of chemistry in a secondary education system.

ACS Division of Organic Chemistry Outstanding Senior Organic Chemistry Student. For senior students who have displayed a significant aptitude for organic chemistry in coursework and research accomplishments. Awardees receive a certificate of recognition from the ACS Division of Organic Chemistry.

Chemistry & Biochemistry Leadership Award. For a senior that has devoted substantial time and energy to create sustainable programs or other changes that fundamentally improve the student experience in the Department of Chemistry & Biochemistry.

The General Electric Prizes for Honors Majors in Mathematics. Awarded to senior honors majors in the Department of Mathematics who, in the opinion of the members of the faculty, excelled in mathematics during their undergraduate career.

The General Electric Prizes for Majors in Mathematics. A similar award to senior majors.

The George Kolettis Award in Mathematics. An award established by friends of the late Prof. George Kolettis, for a graduating senior who excelled in mathematics and contributed notably to the esprit de corps of the mathematics student body.

The Aumann Prize for First Year Students in Mathematics. A prize given by Ms. Monika Caradonna in honor of her father, Prof. Georg Aumann, awarded on the basis of a competition among First Year honors mathematics students.

The Norman and Beatrice Haaser Mathematics Scholarships. These scholarships, made possible by the generosity of Professor and Mrs. Haaser, are awarded to worthy, needy students majoring in mathematics.

R. Catesby Taliaferro Competition for Sophomore Mathematics Honors Students. Friends and students of the late Professor Taliaferro established this prize, which is awarded to a sophomore mathematics major on the basis of an essay submitted by the student.

J & C Sophomore Award in Mathematics. Exemplary performance in mathematics classes by a non-honors math major sophomore female or minority (AfricanAmerican, Asian, Hispanic, Native American) student.

Neuroscience and Behavior Senior Awards for Academic Excellence

Outstanding Undergraduate Research Award. Seniors nominated for this award must be exemplary undergraduate researchers with at least 3 semesters (or 2 semesters and 1 summer) spent in a Notre Dame faculty laboratory. The student must have made a significant intellectual

contribution to their lab, typically evidenced by a co-authored publication and/or national or regional conference presentation.

Outstanding Undergraduate Teaching Award. Seniors nominated for this award must have consistently demonstrated excellence in teaching, either through undergraduate teaching assistantships, community education, mentorship, or other direct teaching experience. The student will have demonstrated commitment to teaching excellence through multiple semesters (minimum of 2) of superior teaching performance, as demonstrated by the quality of teaching reviews, faculty or community mentor recommendation.

Outstanding Undergraduate Leadership and Service Award. Seniors nominated for this award must be exemplary student leaders in the Neuroscience and Behavior major and/or the University at large. The student will have made outstanding contributions, through their leadership and service, to advance the interests of other students in the major and/or make significant impact on the larger Notre Dame or South Bend communities.

Universal Scholar Award. Seniors nominated for this award demonstrate remarkable capability across multiple domains (research, teaching, leadership, service), while simultaneously demonstrating the character traits and behaviors that align with the teachings of Catholic Social Tradition: The Common Good, Life and Dignity of Human Persons, Correlation of Rights and Responsibilities, Preferential Option for the Poor, Care for Creation, and Solidarity.

Outstanding Senior Physics Major. This award is given to the outstanding senior physics major, who, in the judgment of the departmental faculty, shows the most promise for a distinguished career in physics. Course grades, the opinion of those who have taught Special Opportunities the candidates, and any research performance are considered in making the award.

Paul Chagnon Award. An award to be given to a senior physics major for demonstrated character and leadership and for service to the University, the physiscs department, and to his or her fellow physics majors.

Physics Outstanding Undergraduate Research Award. A monetary award given for excellence in research to an undergraduate physics major.

DiNardo Award. To the outstanding junior preprofessional student.

Emil T. Hofman Scholarships. To six outstanding students pursuing premedical studies.

J.C. Lungren, M.D., Scholarships. Awarded to three outstanding science preprofessional students.

The Lawrence H. Baldinger Award. To seniors in the preprofessional program who excelled in scholarship, leadership, and character.

The Patrick J. Niland, M.D., Award. A monetary award given to a preprofessional studies senior to purchase books for the first year of medical school.

The Samuel Chmell, M.D., Award. To an outstanding senior in preprofessional studies who exemplifies high academic achievement and uncompromising integrity within the program.

The Rev. Joseph L. Walter, C.S.C., Award. To a senior with a keen social awareness who shows great promise as a concerned physician.

Special Opportunities

Glynn Family Honors Program. In the fall of 1983, the University inaugurated an honors program for a small number of outstanding students in the College of Arts and Letters, the College of Science and the School of Architecture. A limited number of students with academic intents for each college are identified at the time of admission. Although selection criteria include the promise of outstanding academic performance as demonstrated by standardized test scores and high school performance, the program is looking for more than mere academic ability. It hopes to identify students with a deep intellectual curiosity and interdisciplinary interests.

The program offers honors sections to fulfill most of the University and college requirements in the students' freshman and sophomore years. For Science majors, these include the yearlong Honors Seminar (satisfying the writing and literature requirements), Honors Philosophy, and Honors Theology. Since these courses are restricted to Glynn honors students, they are smaller than non-honors sections and are usually taught in a seminar format. The teachers for honors sections are chosen from the most outstanding teachers in each college.

After the first year, students' academic work will be centered in their major field of study, but each semester the program offers the opportunity to take elective courses in a variety of subjects. Additionally, honors students take two colloquia focused on senior thesis research during senior year. During the spring of senior year, all students in the Glynn program are required to submit a senior research thesis that reflects at least two semesters' work under the guidance of a faculty advisor. In Science, the research for this project usually begins sophomore year. Because of the generous endowment of the program by John and Barbara Glynn and family, students may apply for available funding for qualified project proposals, including summer research.

In addition to the more narrowly academic features of the honors program, students will be offered various opportunities for broadening personal, cultural, and spiritual growth. Workshops, liturgical events, social gatherings, informal discussions, and cultural excursions are available.

Further information on the structure and content of the Honors Program may be obtained by contacting Prof. Holly Goodson or Prof. Paul Ocobock, 205 O'Shaughnessy Hall, Notre Dame, IN 46556, 574-631-5398.

The Environmental Research Center (UNDERC), a University facility, is composed of approximately 7,500 acres located primarily in the Upper Peninsula of Michigan. Research is conducted at UNDERC by undergraduate as well as graduate students on a variety of environmental problems, including the manipulation of ecosystems. Internships are available to support student participation in BIOS 35502 Practicum in Environmental Field Biology, BIOS 35503 Practicum in Environmental Biology West, and BIOS 35504 Research Projects in Field Environmental Biology at UNDERC each summer semester.

Study Abroad. Students from any of the majors in the College of Science may participate in one of the University of Notre Dame's study abroad programs. Science students who go abroad generally do so in one of the two semesters of their junior year. Students applying to medical or dental school during the summer following their junior year (to enter after their senior year) should not study abroad in the spring semester of their junior year. Science students interested in study abroad should discuss their plans with their advisor and with the director of study abroad, Prof. Dana

Lashley, 367 Nieuwland Science Hall. Further information can be obtained through Study Abroad, 105 Main Building.

- Academic Programs Housed in the Science Dean's Office (https://catalog.nd.edu/undergraduate/science/science-deans-office/)
  - Neuroscience and Behavior (BS) (https://catalog.nd.edu/undergraduate/science/science-deans-office/neuroscience-behavior-bs/)
  - Science - Computing (BS) (https://catalog.nd.edu/undergraduate/science/science-deans-office/science-computing-bs/)
  - Science - Education (BS) (https://catalog.nd.edu/undergraduate/science/science-deans-office/science-education-bs/)
- Applied Computational Mathematics and Statistics (https://catalog.nd.edu/undergraduate/science/applied-comp-math-stats/)
  - Applied & Computational Mathematics & Statistics (BS) (https://catalog.nd.edu/undergraduate/science/applied-comp-math-stats/applied-computational-mathematics-statistics-bs/)
  - Applied & Computational Mathematics & Statistics (Supplementary Major) (https://catalog.nd.edu/undergraduate/science/applied-comp-math-stats/applied-computational-mathematics-statistics-supp/)
  - Scientific Computing (Minor) (https://catalog.nd.edu/undergraduate/science/applied-comp-math-stats/scientific-computing-minor/)
  - Statistics (BS) (https://catalog.nd.edu/undergraduate/science/applied-comp-math-stats/statistics-bs/)
  - Statistics (Supplementary Major) (https://catalog.nd.edu/undergraduate/science/applied-comp-math-stats/statistics-supp/)
- Biological Sciences (https://catalog.nd.edu/undergraduate/science/biological-sciences/)
  - Biological Sciences (BS) (https://catalog.nd.edu/undergraduate/science/biological-sciences/biological-sciences-bs/)
  - Biological Sciences (Minor) (https://catalog.nd.edu/undergraduate/science/biological-sciences/biological-sciences-minor/)
  - Environmental Sciences (BS) (https://catalog.nd.edu/undergraduate/science/biological-sciences/environmental-sciences/)
  - Environmental Sciences (Second Major) (https://catalog.nd.edu/undergraduate/science/biological-sciences/environmental-sciencs-supp/)
  - Science & Patient Advocacy (Minor) (https://catalog.nd.edu/undergraduate/science/biological-sciences/scientific-patient-advocacy-minor/)
  - Sustainability (Minor) (https://catalog.nd.edu/undergraduate/science/biological-sciences/sustainability-minor/)
  - UNDERC Field Biology Programs (https://catalog.nd.edu/undergraduate/science/biological-sciences/underc-field-biology-programs/)
- Chemistry and Biochemistry (https://catalog.nd.edu/undergraduate/science/chemistry-biochemistry/)
  - Biochemistry (BS) (https://catalog.nd.edu/undergraduate/science/chemistry-biochemistry/biochemistry-bs/)
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  - Chemistry (Minor) (https://catalog.nd.edu/undergraduate/science/chemistry-biochemistry/chemistry-minor/)
- Mathematics (https://catalog.nd.edu/undergraduate/science/mathematics/)
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  - Mathematics (BS) (https://catalog.nd.edu/undergraduate/science/mathematics/mathematics-bs/)
  - Mathematics (Second Major) (https://catalog.nd.edu/undergraduate/science/mathematics/mathematics-supp/)
  - Mathematics for Engineers (Supplemental Major) (https://catalog.nd.edu/undergraduate/science/mathematics/mathematics-engineers-supp/)
- Physics and Astronomy (https://catalog.nd.edu/undergraduate/science/physics-astronomy/)
  - Physics (BS) (https://catalog.nd.edu/undergraduate/science/physics-astronomy/physics-bs/)
  - Physics (Second Major) (https://catalog.nd.edu/undergraduate/science/physics-astronomy/physics-supp/)
  - Physics in Medicine (BS) (https://catalog.nd.edu/undergraduate/science/physics-astronomy/physics-medicine-bs/)
- Pre-Professional Studies (https://catalog.nd.edu/undergraduate/science/preprofessional-studies/)
  - Compassionate Care in Medicine (Minor) (https://catalog.nd.edu/undergraduate/science/preprofessional-studies/compassionate-care-medicine-minor/)
  - PreProfessional (BS) (https://catalog.nd.edu/undergraduate/science/preprofessional-studies/preprofessional-bs/)
- Eck Institute for Global Health (https://catalog.nd.edu/undergraduate/science/eck-institute-global-health/)
  - Global Health (Minor) (https://catalog.nd.edu/undergraduate/science/eck-institute-global-health/global-health-minor/)
- Special Programs (https://catalog.nd.edu/undergraduate/science/special-programs/)
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